Professional Ultrasound Services
244 20th Avenue San Francisco, CA 94121-2203
www.jimbaun.com (415) 751-4090

Real-time Scanning Techniques

---

1. **Definition**
   a. An automated B-scan imaging process that permits the display of echo information as it is received by the transducer

2. **General considerations**
   a. Demonstration of motion
      i. Respiratory
      ii. Vascular
      iii. Bowel
      iv. Fetal
      v. Cardiac (echocardiography
   b. Anatomical Survey
      i. Large areas rapidly surveyed
      ii. “Lay of the Land”
      iii. Reduce overall examination time
      iv. Optimize imaging parameters
      v. Tailor study for each patient
   c. Optimizing imaging windows
      i. Optimal image quality depends on angle of insonation
      ii. Optimize specular reflections
      iii. Allow free and subtle adjustment of imaging angle and orientation
      iv. Operator mastery of transducer movements is essential

3. **Transducer movement**
   a. Moving: sliding entire probe position either longitudinally or side to side
   b. Rotating: turning the transducer along its central axis without changing position
   c. Heel-toe: rocking, or slightly angling, the transducer along its axis without changing position
   d. Angling: pointing the transducer “top-bottom” or “right-left” without changing position

4. **Real-time transducers**
   a. Mechanical
      i. Single crystal
      ii. Use of motor to move crystal or other probe component
   b. Electronic

i. Multiple crystal elements
ii. Electronic timing of crystal firing sequences produces a “sweep” of the beam
iii. Sequential linear
iv. Phased array
    1. Linear
    2. Convex
    3. Sector

5. Image Formation

a. Lines of sight: each image is composed of many individual lines of sight
b. Pixels: each line of sight is composed of many picture elements (pixels)
c. Motion: many single images are displayed on the screen in one second to produce the illusion of motion
d. Frame rate: number of frames displayed on the screen per second = frames per second = fps
e. Flicker Fusions Rate: minimum number of images that must be displayed to produce “motion”. For the human eye it is approximately 25 fps